CLAIMS

1. A method of processing a stored image by an effects module, said method including the steps of:
reading said stored image from a storage location to an image processor;
applying a selected effect to said stored image;
writing a resultant image to said storage location.

2. The method of claim 1 wherein the step of applying an effect comprises the process of compositing a foreground image with said stored image.

3. The method of claim 2 wherein said compositing process includes the steps of:
reading an α channel value;
reading said stored image;
reading said foreground;
combining a proportion of said stored image and a proportion of said foreground to produce said resultant image.

4. The method of claim 3 wherein said α channel has values from 0 to 255 corresponding to a range 0 to 1.

5. The method of claim 2 or 3 wherein said compositing process produces a Regular Composite, wherein said resultant image = stored image + (foreground – stored image)α.

6. The method of claim 2 or 3 wherein said compositing process produces an Associated Composite, wherein said resultant image = foreground + (1-α) stored image.

7. The method of claim 1 wherein the step of applying an effect comprises the process of convolving pixel values of said stored image with a coefficient kernel.

8. The method of claim 7 wherein said coefficient kernel is a table in DRAM with coefficients arranged in the same order as said stored image pixels to be processed.

9. The method of claim 7 or 8 wherein said kernel is variable in size and supports the sizes 3x3, 5x5 and 7x7.

10. The method of claim 1 wherein the step of applying an effect comprises the process of color replacement which includes the steps of:
reading a component color value of a pixel from said stored image;

looking up a new component value from a lookup table for each pixel;
writing said new value to said resultant image.

11. The method of claim 1 wherein the step of applying an effect comprises the process of complex color transformation which includes the steps of:
reading an L*a*b* indexed color component of a pixel from said stored image;
looking up resultant transformations in lookup tables for each of said L*a*b* indexed pixel components;
writing an output pixel to said resultant image.

12. The method of claim 11 wherein said looking up step further comprises the steps of:
reading said resultant transformations in a first lookup table to map said L*a*b* color components to new L* values;
reading said resultant transformations in a second lookup table to map said L*a*b* color components to new a* values; and
reading said resultant transformations in a third lookup table to map said L*a*b* color components to new b* values.

13. The method of claim 11 or 12 wherein, for any resultant transformations not included in said lookup tables, said output pixel value may be obtained by tri-linear interpolation.

14. The method of claim 1 wherein the step of applying an effect comprises the process of image warping which includes the steps of:
constructing an image pyramid;
scaling a warp map to match said stored image;
calculating a span of said stored image pixels represented in each output pixel; and
calculating a value of an output pixel from said image pyramid.

15. The method of claim 14 wherein the step of constructing an image pyramid includes the step of performing a 3x3 convolve on 1 in 4 of said stored image pixels.

16. The method of claim 14 wherein the step of scaling a warp map includes the steps of:
determining a corresponding position in said warp map for said output pixel;
reading said corresponding position values from lookup tables;

bi-linearly interpolating said corresponding position values to determine an actual value; and

scaling said actual values to place them in the same domain as said stored image.

17. The method of claim 16 wherein said reading step further comprises reading X values from an X warp-map lookup table and reading Y values from an Y warp-map lookup table.

18. The method of claim 17 wherein said X and Y warp-maps have a different spatial resolution from said stored image.

19. The method of claim 14, 16, 17 or 18 wherein said warp maps are represented by 8 or 16 bit values that correspond to said stored image size.

20. The method of claim 14 wherein said span calculation step includes the steps of:

determining the absolute distance in X and Y between one point in said warp map and two other such points;

taking a maximum of said absolute distances to be said span.

21. The method of claim 14 wherein said output pixel calculation step includes the steps of:

for said span s, where $s \leq 1$, reading pixel values of said stored image around a given point and performing bi-linear interpolation; or

for said span s, where $s > 1$, reading pixel values of said stored image around a given point on two appropriate levels of said image pyramid and performing tri-linear interpolation.

22. An effects processor for an effects module that applies effects to stored images, said effects processor comprising:

a central processing unit;

a fast integer multiplication unit;

program memory associated with said central processing unit, said program memory storing program steps for execution by said central processing unit to apply effects to said stored images;

an interface unit communicating with components of said effects unit; and

a serial bus interface for reception of stored images and transmission of resultant images.

23. The effects processor of claim 22 wherein said effects processor is an integrated circuit.

24. The effects processor of claim 22 wherein said central processing unit is a RISC processor core running at 48 MHz.

25. The effects processor of claim 22 wherein said fast integer multiplication unit is a DSP.

26. The effects processor of claim 22 further comprising scratch memory associated with said central processing unit for variable storage.

27. The effects processor of claim 22 wherein said program memory comprises VARK language software.

28. The effects processor of claim 22 wherein said serial bus interface communicates with a Serial Bus of a compact printer system including one or more further modules, said Serial Bus communicating power and data between said effects module and said one or more further modules.

29. The effects processor of claim 22 wherein said interface unit is a parallel interface communicating with a plurality of buttons for selecting and applying effects to said stored images, said parallel interface also communicating with a LCD for providing feedback to a user.

30. The effects processor of claim 22 wherein said stored images are stored in a printer module of a compact printer system.